THE sandy beaches of southern Florida may be great for tourism, but the region’s soil is not so great for crop farming. “In most of south Florida, farmers are trying to grow crops in soil that is beach sand,” says Chuck Obern, owner of C&B Farms in Clewiston, Florida. “We use fertilizers because we really don’t have soil. The only reason that there are farms here is because we have a warm climate and can grow crops throughout the winter.”

C&B Farms is located on the southwest shore of Lake Okeechobee. Vegetable crops, including specialty peppers and eggplants, herbs and ethnic vegetables, are grown on 800 of the farm’s 2,200 acres. Last year, Obern began making compost out of yard trimmings and biosolids and spreading it on his land as a complement to commercial fertilizers.

Obern knew of only two other composting operations in south Florida, one operated by R&D Soil Builder Inc. (see below), and another by the Solid Waste Authority of Palm Beach County, 75 miles away. “We could not afford to pay what Palm Beach County charges for the compost and its delivery,” says Obern. “That’s why we decided to do our own thing.”

Matching Up Farmers With Feedstocks

Monica Ozores-Hampton, a compost researcher at the University of Florida’s Southwest Florida Research and Education Center, has been working to match up farmers who want to do composting with counties, municipalities and organics recyclers who can provide the raw materials. “Several composting operations failed in southern Florida because of complaints from the public about odor problems,” she notes. “Vegetable and citrus farmers can take large quantities of these materials and use them for compost.”

Building Organic Matter Into Florida’s Sandy Soils

Farmers turn to compost-making to increase availability of high-quality materials for application on fields and orchards.

Molly Farrell
When biosolids are not available, ammonium nitrate is added via drip irrigation as a nitrogen source.

Ozores-Hampton says many farmers in south Florida aren't using compost because of the high cost of purchasing, transporting and spreading it. "Everything comes down to economics," she says. "Growers will take up doing on-site composting themselves, if the price is right. Vegetable growers have already made huge investments in drip irrigation and plastic bed covers. They don't have the equipment needed for composting, including tractors, turners and spreaders. However, they're seeing that they have water retention problems because they don't have organic matter in their soil, and commercial fertilizers aren't always effective."

The key, she says, is to make sure that the growers get the feedstocks delivered at no charge. Obern met Ozores-Hampton at a compost workshop she was conducting and she arranged for C&B Farms to receive yard trimmings from Consolidated Resource Recovery, an organics recycling facility in Fort Myers, 75 miles west of Clewiston, and Class AA biosolids from a wastewater treatment plant in the town of Homestead on the southeast tip of Florida, 110 miles from Clewiston. (Class AA biosolids are classified by the Florida Department of Environmental Protection as qualified for distribution and marketing. Details are in the state's Domestic Wastewater Residuals rule.) During 2000, C&B Farms received one hundred 100-yard loads of the yard trimmings and thirty-three 22-ton loads of the biosolids from these sources. "We tried different recipes and the results looked interesting," says Obern. The finished compost was applied on the farm at a rate of three tons an acre. "We saw some indications of improved nutrient holding capacity and better quality crops so we decided to embark on a much more aggressive composting operation."

Increasing The Compost Flow

In September 2000, Ozores-Hampton put Obern in touch with Delta Recycling Corporation, an organics recycler located in Pompano Beach, which was taking in yard trimmings from the cities of Davie, River Beach, West Palm Beach and Pompano Beach along the east coast of Florida. Seven to eight 100-yard loads of municipal yard trimmings began being hauled to C&B Farms six days a week at a distance of up to 75 miles one way.

Obern set aside a 20-acre section of his farm for composting and purchased a used six-yard bucket loader and Scat turner. "The material was rather coarse," notes Obern. "In other areas, the compost is finer because composters have access to dairy and poultry manures to augment the yard waste. I just don't
COMPOSTING MANURE FOR VALUE-ADDED PRODUCTS
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have it. Tourism is the number one industry here in south Florida, and there aren’t any dairies or poultry farms.” Obern is working to obtain horse manure from a race track in Pompano Beach.

Obern says he has found Class AA biosolids are the easiest and most accessible amendment to add to yard trimmings. “We’re located in a very sensitive area of south Florida near the Everglades, where the issue of phosphorus runoff from farms is huge,” he notes. “Class AA sludge is classified as a fertilizer so we don’t need a permit to use it in our compost recipe. If we wanted to receive Class B sludge, we would have to go through a long permitting process with the Florida Department of Environmental Protection, and it can’t be used on food crops for 16 months.”

In early October 2001, C&B Farms received its first load of Class AA biosolids from the city of Cape Coral, about 90 miles west of Clewiston. The city pays C&B to take the biosolids and C&B uses the money to pay for delivery. Ozores-Hampton facilitated the agreement and analyzed the material for nitrogen (3.5 percent) and pH (12). “The pH is rather high because lime is added to sludge to raise the pH to be classified as Class AA,” explains Obern. “We’re hoping that the organic acids formed during composting will neutralize the lime and drop the pH.”

C&B Farms is mixing these biosolids with the seven to eight 100-yard loads of yard trimmings a day from Delta Recycling, now a subsidiary of BPI.

Each windrow is 925 feet long and contains approximately 1,500 yards of material. The dimensions of the windrows are determined by what the turner can handle: 18 feet wide and six to eight feet tall, with eight-foot wide rows between the windrows. “We chose the seat because it can turn high windrows,” notes Obern. “We could look at making smaller windrows but that would take more space. If we go down in height, we have to go out in length.”

Windrows are turned every day for three to four weeks, and then every other day for two to three...
months depending on when the thermophilic cycle ends. "The yard trimmings we're getting are rather woody so it takes seven to nine months to make finished compost," says Obern.

When he first began composting, the C:N ratio was 55 to 1. Obern initially hoped to use the Class AA biosolids from Homestead, which are 5.5 percent nitrogen, to lower the ratio. "The problem with biosolids is that they are only available during Florida's dry season because they are air-dried outdoors and it rains every day during the summer. We needed an alternative source of nitrogen when biosolids are not available."

Obern built a drip irrigation system and adds nitrogen in the form of ammonium nitrate, a commercial liquid fertilizer, during composting. The irrigation system is composed of one-inch-diameter poly tubing with drip emitters installed on five-foot centers. When a windrow is built, the tubing is placed on top of it and water and ammonium nitrate are pumped through the tubing with a 12-volt pump.

When a windrow is turned, the hose is moved over to one side of the windrow and the other half is turned. The next day, the hose is moved to the other side and the remaining half is turned. "The latest lab reports show that the C:N ratio is now 26 to 1," says Obern.

Boosting Organic Matter and Soil Quality

"We started with organic matter of 0.9 percent and now have it up to 2.3 or 2.4 percent," notes Obern. "Our goal is to get it up to around seven percent. This will increase the cation exchange and water holding capacities of the soil, and hopefully get some microbial enhancement of root growth which will lead to higher crop yields and higher crop quality."

The compost is applied once per crop prior to planting, at a rate of 50 tons/acre. Obern is already noticing improvements in his crops. "At this high rate of compost application, it seems like the soil is retaining a lot of nutrients. The crop has a beautiful color. In early October, we had more than four inches of rain within a few days and the crops are still green."

Composting at C&B Farms has been hampered by two problems that Obern hasn't been able to find solutions for: heavy rainfall and small spreaders. "We get a total rainfall in excess of 70 inches yearly and can get 40 to 60 inches of rain on a three-month crop," he says. Between September 1 and October 1, 20 inches of rain had fallen on the farm, leaving the compost site under two to four inches of water. "We can't do composting the way we should under these conditions, but we can't afford to put down 20 acres of asphalt and concrete," he notes. "We've already invested over $150/acre on composting, which is pretty significant. If we have to spend $50,000 to $100,000 on site preparation and drainage, this puts composting outside of the range of what we can afford, so we're searching for ideas on site preparation."

The second problem, he says, is that even large manure spreaders are not large enough for spreading compost. "We have an H&S Model 3300, which is a 30-yard machine and the biggest manure spreader made, but it can only spread compost on six acres a day," explains Obern. "If you plant 30 acres a week and it takes five ten-hour days to put out compost, then it's taking one guy working full time to put the compost down. We need to get a really big spreader to put out the large amounts of compost needed for our operation."

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